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Reducing vandalism in elevators:

The use of visual cues to nudge an altruistic behavior

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Abstract:

Vandalism is an issue from which many people, policymakers and organizations suffer. This study investigates the use of visual cues (i.e., Nudges) to reduce vandalism in elevators. An online questionnaire was administered to n = 264 participants, they were primed with one of three visual cues, then asked to answer a set of questions. Results indicate that the image of a hero is the most effective one in reducing vandalism; they also show that Nudges in the form of visual cues are situation dependent and that variables such as gender are important to take into consideration while planning Nudge interventions.

Keywords

Nudge, prosocial behavior, social marketing, vandalism, visual stimuli

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1. Introduction

Vandalism is an issue from which many individuals, groups and organizations suffer and on which extensive research has been conducted to explore the motives behind the actions of people that engage in such acts (Luengo et al., 1994; Yilmaz & Olgun, 2016; Havârneanu, 2017). Part of a broader body of literature that aims to uncover the importance of prosocial behavior and to test ways in which antisocial behavior can be addressed effectively, vandalism can take many forms such as theft, littering and any property destruction (Pfattheicher et al., 2019). It has also been found to be the product of both environmental (Broken Window Theory) and emotional (positive and negative urgency) factors (Liu et al., 2019; Cyders et al., 2007), the former being the most important one to take into consideration.

In recent years, research about the use of social marketing tactics to counter all types of antisocial behavior, including vandalism, has been encouraged (Boyle & Proctor, 2009). As such, Nudge, an approach based on psychological concepts to build effective and low-cost social marketing tactics has been explored and a considerable body of literature has been built (Pedwell, 2017). One of the Nudges that has proven to be very effective in driving prosocial behavior, mainly in reducing crime, is the use of images and/or written text messages. In fact, these Nudge interventions have been so effective that many western countries created Nudge units. The United Kingdom for instance has decided to use images in public spaces, which resulted into a considerable decrease in vandalism-related crimes such as property degradation and littering (Dear et al., 2019).

Most research conducted up to date focused on the Watching Eyes Effect, which is created by adding a picture of eyes gazing at research participants and attempted to adapt it to different contexts to determine the impact it has on individuals, primarily on their prosocial intentions (Bateson et al., 2006; Nettle et al., 2013). However, there is a lack of knowledge as to the impact

that the watching eyes can have on the behavior of people that engage in vandalism. Furthermore, most research has focused on stimuli such as eyes to drive prosocial behavior and did not attempt to adapt other visual cues for the same purpose.

As such, given that acts of vandalism are the primary cause of frequent elevators breakdown in low-cost housing (Au-Yong et al., 2018), the aim of this research is to investigate the potential impact that visual cues in the form of pictures have on reducing vandalism in social housing elevators and contribute to the existing literature by testing not only the Watching Eyes Effect, but also two more visual cues in the form of a cute gazing puppy and a hero image. The goal behind using these visual cues is to appeal to individuals' subconsciousness, morals and values, and biological need to take care of the weakest. The images used for this study have been designed in order to be applied in social neighborhoods in Lisbon where vandalism in elevators is an issue that residents suffer from and that needs to be addressed; this research hence offers ground for their application. The present document begins with a literature review in which existing knowledge will be presented, followed by a methodology section, results, and a discussion. This research will conclude with a section in which practical implications will be addressed, as well as limitations and suggestions for future research.

2. Literature review

2.1. Introduction to vandalism

Dating back to the late 18th century, the word vandalism was coined by the Bishop of Blois Abbé Henri Grég to describe systematic revolutionary violence and cultural desecration; it eventually made its way to the "Dictionnaire de l'Académie Française" four years after its coinage, in 1798, and became widely used across Europe shortly after (Merrills, 2009). Today, vandalism is a term used to describe "a willful or malicious destruction, injury, disfigurement, or defacement of any public or private property, real or personal, without the consent of the owner or persons

having custody or control" (Ceccato & Haining, 2005; p. 1638). Most definitions of vandalism involve key aspects such as the willful or malicious destruction of objects and voluntary degradation (Yilmaz & Olgun, 2016). Vandalism is hence an antisocial behavior (Luengo et al., 1994) that impacts different areas and properties, such as railways (Havârneanu, 2017), urban equipments (Yilmaz & Olgun, 2016), and residential buildings (Au-Yong et al., 2018), the latter being an issue from which social neighborhoods' residents in Lisbon suffer from.

Vandalism is affected by both environmental and emotional factors. Negative emotions such as stress, anger, and boredom are all emotions that can lead an individual to commit acts of vandalism (Yilmaz & Olgun, 2016). On the other hand, a considerable body of literature explored the impact of increased positive mood (positive urgency) on our behavior and concluded that positive urgency leads to risky behavior and rash actions such as vandalism (Yuen & Lee, 2003; Zapolski et al., 2009; Cyders et al., 2007).

Vandalism is an antisocial behavior (Luengo et al., 1994) that can take various forms, such as burglary, revenge, theft, littering and any property destruction, be it deliberate or not (Nordmarker et al., 2016; Pfattheicher et al., 2019). Littering, a worldwide problem threatening the environment (Almosa et al., 2017a), has far more consequences than it might seem. In fact, besides the environmental and aesthetic issues (contamination source, indirect health hazard, attraction of insects, etc…), litter also poses a social problem since experimental evidence has concluded that it results in an increase in other types of social wrongdoings (Schultz et al., 2013). This finding, known as the Broken Window Theory (BWT), is a criminological concept published in 1982 that has since then attracted the attention of researchers in other disciplines aiming to uncover the impact it has on neighborhoods and residents (Liu et al., 2019). The BWT suggests that a vandalized environment, no matter how small the type of vandalism is, results in a perception that

such antisocial behavior is permitted in the bespoken environment, which in turn leads to more frequent and significant vandalism acts (Thompson et al., 2012).

In a series of six experiments titled the "The Spreading of Disorder", Keizer et al. (2008) revealed that the mere observation of other people's violation of certain rules or social norms results in a spread of disorder since the likelihood that the observers engage in similar, or more significant violations, increases. The Broken Window Theory has also been applied to the tourism industry in order to investigate tourists prosocial behavior; results show that tourists are more likely to engage in antisocial behavior such as littering when the environment is perceived as already littered, while in a clean environment, tourists are more likely to display a prosocial behavior by attempting to preserve the environment (Liu et al., 2019), which raises questions regarding the surrounding environment's impact on peoples' motivation.

In addition to the BWT, other researchers shed light on the important role environmental factors play in driving altruistic behavior. Schultz et al. (2013) analyzed individuals' behavior toward litter and concluded that factors such as already existing litter and the location of litter bins have a significant impact on littering behavior. Almosa et al. (2017b) used an observational approach which led to the same results about the influence of the environment on littering behavior, concluding that the only individual factor to impact people's behavior is group size.

2.2. Nudges and Behavioral interventions

Prosocial behavior, defined as "voluntary acts intended to benefit others and to promote harmonious relationships" (Jang et al., 2020; p. 471), is very beneficial for societies and individuals as it promotes peaceful coexistence, it is affectively gratifying, and in the long term, can result in positive social outcomes (Christner et al., 2020). Several researchers from different disciplines dived into understanding what influences prosocial behavior under different settings and suggested various theories to explain what drives prosocial and antisocial behavior (Christner et al., 2020;

Jang et al., 2020; Anderson et al., 2010; Kauten & Barry, 2014; Hoffman, 2000). While an initial assumption would be to provide incentives and/or punishments to drive prosocial behavior, their effect in some context is in fact reverse as they result in a decreased motivation; for instance, paying blood donors resulted in less supply, imposing fines on parents who pick up their children late at day-care resulted in an increase of late pick-ups, and schoolchildren were less inclined to donate for charitable organizations when presented with performance incentives (Bénabou & Tirole, 2006). As such, it is important to explore different ways to drive prosocial behavior, using smarter and less costly tactics that can yield a positive result and have a significant impact on decreasing vandalism.

The end of the last century saw the emergence and development of a new type of marketing technique that aims to apply conventional marketing tactics to social issues in an attempt to influence behaviors and therefore benefit individuals and societies (Saunders et al., 2015). Initially introduced in early 1970, researchers defined social marketing differently throughout the years; it is until 2013 that a consensus definition has been agreed on among the International Social Marketing Association, the European Social Marketing Association, and the Australian Association of Social Marketing. The three influential organizations define social marketing as seeking "to develop and integrate marketing concepts with other approaches to influence behaviors that benefit individuals and communities for the greater social good" (Saunders et al., 2015; p. 162; Rundle-Thiele., 2015).

Social marketing has been applied and used to study numerous areas of everyday life including financial decision marking, tobacco and alcohol consumption, sustainability, corporate social responsibility, healthcare, exercising, drug use and tourism (Pechmann, 2015; Wood, 2016; Tkaczynski et al., 2020). Used to overcome antisocial behavior in all its forms, including vandalism and environment pollution (Boyle & Proctor, 2009), social marketing uses concepts from both

marketing and psychology to build knowledge about behavioral change, identify the barriers to an activity to be promoted, and devise a strategy to overcome them (McKenzie-Mohr, 2000).

One of the research areas that borrows techniques from social marketing explored by psychologist and behavioral economists in recent years is Nudge interventions (Pedwell, 2017). Nudge is a relatively recent area of study that consists of a "(…) choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives; (…) the intervention must be easy and cheap to avoid" (Thaler & Sunstein, 2008; p. 6). While Nudge attracted the attention of many behavioral scientists, such as Nobel prize winner Daniel Kahneman, or authors of bestselling books Dan Ariely and Richard Thaler (Kosters & Van der Heijden, 2015), influencing people's decision making process has been adopted by many policymakers, leading to the creation of "Nudge units", in England in 2010, referred to as the Behavioral Insight Team, in the United States during the Obama administration, and in other western European countries (Benartzi et al., 2017, Kosters & Van der Heijden, 2015).

Among the various choice architecture tactics recently tested to nudge people's behavior, many have resulted in interesting results. Van der Meiden et al. (2019) tested the impact of footprints on employees' physical activity in office; the 14,357 observations recorded at a Dutch retailer's headquarter demonstrated that the simple addition of footprints significantly increased employees' stair use, and removing the prints resulted in a substantial decrease. In two other experimental studies, Ranson and Guttentag (2019) tested the impact of perceived social presence on Airbnb guests' altruistic behavior. In both studies, conducted using physical Airbnb properties, the social presence was increased by adding objects such as family photographs, children's artwork, and handwritten welcome notes in one setting, and compared with the same property lacking these elements; guests were sent an email the night before they left the appartement politely

asking them to leave the property clean. The results demonstrated that these simple Nudge interventions considerably increased guests' altruistic behavior prior to departure.

Nudge has also been used to drive prosocial behavior. In fact, many studies have been conducted to measure the effectiveness of simple printed images and/or texts, such as gazing eyes or pictures of superheroes, to influence individuals' intention to have a prosocial behavior (Pfattheicher & Keller, 2015; Bateson et al., 2006; Dear et al., 2019; Van Tongeren et al., 2018). While most of these studies have tackled behaviors such as increasing charity donations and helping others, no researchers attempted to use Nudges to address vandalism in elevators. As such, the aim of this research is to test Nudges' effectiveness, namely the Watching Eyes Effect, the use of superheroes images and the use of cute dog gazing images, along with texts, to build a more prosocial behavior in elevators. Given that vandalism in elevators is a recurrent issue from which a number of residents in social neighborhoods suffer (including in Lisbon), the reverse effect of punishments and rewards, and the high potential of behavioral interventions in driving an altruistic behavior, we propose the following research question:

RQ: Can a behavioral intervention in the form of visual cues reduce vandalism in elevators and drive prosocial behavior?

2.3. Visual cues as drivers of prosocial behavior

2.3.1. Appealing to subconsciousness through the Watching Eyes Effect

The "Watching Eyes Effect" refers to the process by which the simple feeling of being observed pushes us to modify our behavior without conscious knowledge of an action's cost and benefit (Dear et al., 2019). Scholars argue that this phenomenon, for some individuals, is explained by the social consequence that an antisocial behavior might generate, namely a loss of reputation, while other individuals are motivated to behave in a prosocial manner no matter the cost or benefit

generated from it (Haley & Fessler, 2005). This concept is challenged by the "strong reciprocity" theory where individuals are predisposed to cooperate with others (Gintis et al., 2003) and be "generous even toward unrelated individuals" (Bateson et al., 2006; p. 412). The Watching Eyes Effect has been used in several studies and applied to many contexts; while CCTV results in a 16% crime reduction, the Watching Eyes Effect has proven much more effective with a 35% reduction in the risk of antisocial behavior (Dear et al., 2019).

In one of the most popular experiments to which the watching eyes were applied, researchers Bateson et al. (2006) tested their influence on prosocial behavior in a real-life setting. The experiment consisted of a sale of coffee, tea, and milk to which participants could pay using an honesty box. The equipment was put in room in a way such that people deciding not to pay could not be observed. Throughout the experiment duration, researchers alternated pictures of flowers and watching eyes every week, printed above the tea, coffee and milk prices and recorded the amount of money collected every week through the honesty box. The experiment resulted in an increase in contribution level during watching eyes week and a decreased during flowers' week.

Other popular studies conducted to assess the effectiveness of the Watching Eyes Effect on prosocial behavior include one of the earliest studies tackling eye cues in which Haley and Fessler (2005) used the dictator game to determine how much of a US$10 endowment an individual (i.e., the dictator) is willing to allocate to a second participant; results showed that eye cues significantly increase participants' generosity, even under anonymity. In another study, Nettle et al. (2013) compiled data from seven studies involving 887 participants in which the dictator game was used to assess generosity and concluded that although the mean donation is not increased, eye cues reliably increase the probability of donating something.

Conty et al. (2016) suggest that the watching eyes result in a subconscious reaction in which individuals' self-awareness is triggered causing an adjustment of behavior. The change in behavior

is due to the activation of memory encoded items that alter the way information are processed and lead individuals to act as if there is a risk of reputation loss. Parts of our brain are wired to involuntarily detect and be activated by environmental stimuli (i.e., Eye cues), in turn resulting in an involuntary adjustment of behavior and an unconscious increase of altruism (Burnham & Hare, 2007). While a number of studies challenge the effectiveness of watching eyes on prosocial behavior, the United Kingdom used the cues in different areas which yielded positive results. In 2006, the British police, in an effort to reduce crimes and vandalism, put watching eyes and a message in 100 buses, they have also been added to trees and motorway service stations to reduce littering and used across the British rail network, which resulted in a 40% crime reduction in Nottinghamshire town of Hucknall and a 23% littering reduction in motorway service stations. Eye cues have been so successful in the UK that the 2017 National Anti-Littering Strategy recommended their use to reduce littering (Dear et al., 2019). Hence, we attempt to appeal to individuals' subconsciousness, and formulate our first hypothesis:

H 1: Watching eyes visual cues are effective in reducing vandalism in elevators.

2.3.2. Appealing to morals and values through the inclusion of other in self

Throughout history, heroes have played important roles within societies and their influence still exists in modern life; heroes have a psychological influence on individuals (Kinsella et al., 2015). Heroism influences us in two ways: on one hand, heroes embody moral courage and the ability to do the right thing, which influences us in acting in a prosocial manner. On the other hand, since heroes are perceived as living meaningful lives, they influence us to do the same (Van Tongeren et al., 2018), which has been correlated with prosocial behavior in a previous study where Klein (2017) investigated the link between prosocial behavior and meaning of life and came to the conclusion that meaning of life is an incentive that people seek when acting in a prosocial manner.

Being exposed to heroes leads to the arousal of positive emotions such as awe, gratitude, or admiration, which creates a motivation to become a better person by raising awareness of the ideal self (Kinsella et al., 2015). The exemplary other, such as heroes, motivates individuals to improve themselves, their relationships, and their behavior (Algoe & Haidt, 2009).

Although people are intrinsically motivated to seek heroes, it is not until the beginning of this century that heroism has received more serious attention from various disciplines (Franco et al., 2018). In psychology, the process of inclusion of other in self helps explain why we are so much influenced by heroes (Sullivan & Venter, 2005). This principle suggests that close relationships result in an expansion of the self and results in experiencing some aspects of the other as one's own, merging the cognitive construction of the others with the one of the self (Branand et al., 2019). This concept, initially used to describe how individuals' self-concept is influenced by their partner, provides a psychological explanation of individuals' influence by the heroes they identify with and their connection to them (Sullivan & Venter, 2005).

Peña and Chen (2017) investigated the effect of superheroes/villains on prosocial behavior by measuring helping intention of participants after being primed with these stimuli. Results showed that participants primed with superheroes exhibited a higher helping intention than the control group while those primed with villains showed a lower helping intention. In a prior study, participants were offered to play a video game and were assigned to one of the three conditions: play as a heroic character (Superman), a villain (Voldemort), or as a neutral geometric form. They were then asked to pour an unspecified amount of either chocolate or hot sauce in a dish that will be consumed by a subsequent participant. As predicted, the participants assigned to the heroic character condition gave more chocolate than the ones assigned to the two other conditions; while participants assigned to the villain condition poured more hot sauce than those who played with the neutral avatar or the superhero (Yoon & Vargas, 2014).

The hero function framework indicates that heroes serve three functions: enhancing, morals and values modeling, and protecting (Kinsella et al., 2015). Given individuals' intrinsic motivation to seek heroes and the influence perception of heroism has on individuals' decision making and everyday behavior (Franco et al., 2018), we attempt to appeal to individuals' morals and values, and formulate our second hypothesis:

H 2: Hero visual cues are effective in reducing vandalism in elevators.

2.3.3. Appealing to the biological need to take care of the weakest through Kindchenschema

The Baby Schema (Kindchenschema or "cute response") is a set of infantile facial characteristics, such as large head and eyes, found in humans and animals, discovered to be a trigger for the display of caretaking behavior, reduction of the likelihood of aggression, creation of positive affect and influence on the affective orientation (Borgi et al., 2014).

Neuroscience unveiled how our brain reacts when exposed to Kindchenschema. In a study conducted using functional Magnetic Resonance Imaging (fMRI), scientists scanned females' brains while they were presented with pictures of babies, the results showed that the "cute response" activate the nucleus accumbens, a key part of our brain's reward system (Glocker et al., 2009b); further research came to the conclusion that a dog gaze increases oxytocin (Nagasawa et al., 2009), the latter being considered a prosocial hormone (Luo et al., 2015).

The attention allocated to a stimulus is a predictor of the processing and analysis of that stimulus and will in turn result in the preparation of an adaptive response; while the brain dedicates considerable attention to potentially threatening stimuli, the attention system prioritizes also positive biologically significant ones, such as baby faces (Brosch et al., 2007). Whereas most studies have investigated the Kindchenschema effect on adults and concluded that the Baby Schema results in caretaking behaviors, increased attraction, affection, positiveness, sensitivity and

higher likelihood to be adopted, few have tackled other groups such as the younger generation (Luo et al., 2011; Luo et al., 2020). In a recent study, Luo et al. (2020) asked a sample of 78 adolescents and 77 adults to rate their likability of 148 neutral faces and found that, although underdeveloped for the younger generation, the Baby Schema occurs in adolescence.

While questions were raised regarding whether the Baby Schema was specific to human babies or could be extended to other species, later research confirmed that the cute response can be generalized to pets as well, especially to the most common ones such as cats and dogs, since the cuteness coding mechanism is the same for human and non-human faces (Borgi et al., 2014; Golle et al., 2013).

In an attempt to reduce vandalism and antisocial behavior in the streets of London, The Royal Borough of Greenwich mandated Ogilvy Change to come up with possible solutions; while many were advocating for an increase in police officers' presence, Ogilvy Change simply painted pictures of kids on walls gazing at people passing (Gordon, 2012; Rao, 2017), a campaign named "Babies of the Borough" that resulted in a 24% decrease in antisocial behavior (Local Government Association, 2017). Given these elements, we attempt to appeal to individuals' biological need to take care of the weakest and we formulate our third and last hypothesis:

H 3: Gazing puppy visual cues are effective in reducing vandalism in elevators.

3. Methodology

The present study seeks to measure the impact of visual cues on individuals' behavior to reduce vandalism in elevators and drive a more prosocial attitude. Three different pictures representing the three intended effects have been created for the purpose of this study, participants have been randomly assigned to one of the four conditions, a control condition in which participants are not presented with any stimulus and are directly asked to respond to a questionnaire, and three treatments in which participants are primed with one of the three pictures and are then asked to

answer the same questionnaire to measure their attitude toward litter and prosocial behavior. As such, the stimuli (i.e., pictures) are analyzed as independent variables, whereas the Littering Attitude Scale and the Prosocial Behavioral Intention Scale are analyzed as dependent variables.

3.1. Participants and procedure

A survey has been administered to participants through social media and email. The questionnaire received a total of n = 264 responses evenly distributed across four groups, a control condition and three treatments ($n_{\text{per condition}} = 66$). Participants age ranged from 16 to 65 ($M_{age} = 24.38$; SD = 6.1) with a prevalence of 18-24 years old respondents (64%). The answers represented 50 nationalities with a majority of Moroccans (33.7%) and a majority of females (68.2%). Most participants (71.2%) have a level of education equal to or higher than a bachelor's degree.

The data was collected through a survey administered in English through Qualtrics. Three pictures intended to simulate the Watching Eyes Effect (Appendix 1), the appeal to individuals' morals and values (Appendix 2) and the Baby Schema (Appendix 3) were tested. Each picture was composed of a visual component and a written text in which participants were asked to take care of the elevator. Given the hypotheses being tested and the use of pictures as stimuli, a between subject design has been preferred. Participants were randomly assigned to one of the four conditions: control condition (no visual cue), treatment 1 (Gazing Eyes), treatment 2 (Hero), and treatment 3 (Dog). All four conditions were the same, the only component changing was the visual stimulus (picture vs no picture).

After providing consent, participants were first presented with a short scenario that invites them to imagine themselves in an elevator, followed by an instruction text. They were then presented with the Littering Attitude Scale and the Prosocial Behavioral Intention Scale. The questionnaire concluded with demographics questions (age, gender, nationality, and level of

education) (Appendix 4). In order to ensure that the intended effect is created by the stimuli, the pictures remained visible on the respondents' screen throughout the entire time in which they were answering the scales.

3.2. Measure

Participants were primed with one of the three pictures and asked to respondent to two different questionnaires. As described before, littering is a type of vandalism (Pfattheicher et al., 2019), and, to a certain extent, attitude is a predictor of behavior and behavioral intention (Marcinkowski & Reid, 2019); hence, the first scale used for this study is the Littering Attitude Scale (LAS) (Appendix 5), which is a self-reported 15 items questionnaire that measures individuals' attitude toward littering using a 7-points Likert scale (1=strongly disagree, 7=strongly agree) (Ojedokun, 2015). Also, to measure prosocial behavior, the Prosocial Behavioral Intention Scale (PBIS) (Appendix 5) has been used, which is a four items questionnaire that measures helping intention using a 7-points Likert scale (1=would definitely not do that, 7=would definitely do that); this scale presents the advantage of being brief, easy to administer and accurately measures helping intention using simple and easy to understand language (Baumsteiger & Siegel, 2018). Both scales have been tested and validated by other researchers.

4. Results

After the data collection phase, a quantitative approach was applied using SPSS statistics 27 to test the hypotheses. Given that the data consists of two dependent variables and one independent variable, a multivariate analysis has been used to test if the three images (eyes, hero, dog) have an influence on participants attitude toward litter and prosocial intention. Then, regression analyses have been performed to test the impact of demographic variables on the dependent variables.

4.1. Multivariate analysis

4.1.1. Littering attitude

Analyzing whether the eyes, hero, or dog images (independent variables) have an impact on littering attitude (dependent variable), a between-subjects ANOVA showed that there is a significant difference ($F(3, 260) = 2.736$; $p = .044 < .05$) between the control group ($M_{Control} = 5.498$; $SD = .692$), the eyes condition ($M_{Eyes} = 5.616$; $SD = .656$), the hero condition ($M_{Hero} = 5.821$; $SD = .644$), and the dog condition ($M_{Dog} = 5.547$; $SD = .794$). To determine where the difference lies, a Tukey post hoc test was performed and showed that the only significant difference was between the control group and the hero condition ($p = .042 < .05$), while all the other pairs' differences were not statistically significant with p values > .111. These results are graphically represented in in figure 1 bellow.

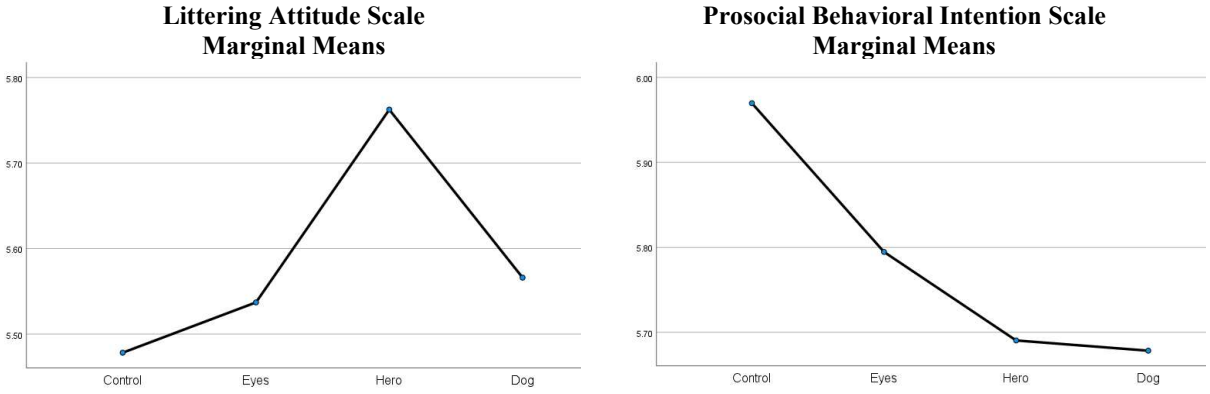

Figure 1: Mean values by condition for the Littering Attitude Scale and the Prosocial Behavioral Intention Scale.

4.1.2. Prosocial behavioral intention

While the mean values of the three treatments were above the control condition for the Littering Attitude Scale, surprisingly, the prosocial behavior intention scores' means were all bellow the control group, these results are graphically represented in figure 1 above. However, using the same procedure applied for the LAS, the ANOVA analysis showed that there is no

significant difference across the four conditions ($F(3, 260) = .679$; $p = .565 > .05$), and a Tukey post hoc test showed that there is also no significant difference between the control group and the three treatments, with all p values > .51.

4.2. Multiple Linear Regression

To determine if demographic variables impact participants attitude toward littering and prosocial intention, two regression analyses were run for the entire data set (n = 264), then for each condition separately ($n_{\text{per condition}} = 66$) using age ($M_{\text{Age}} = 24.38$; $SD = 6.1$), gender ($n_{\text{male}} = 84$; $n_{\text{female}} = 180$), level of education, and nationality. Also, given that respondents represented 50 nationalities, but Morocco was the dominant one ($n_{\text{Morocco}} = 89$), the later was compared to the other nationalities using a binary variable (Morocco = 1, other nationalities = 0).

Results showed that for LAS, age did not significantly impact any regression model, with p values > .239. Under the eyes condition, high school graduate displayed a more positive attitude toward litter than the other groups ($B = .461$; $p = .035 < .05$). Finally, taking the entire data set (n = 264), Moroccan respondents had a more negative overall attitude toward litter ($p = .033 < .05$) compared to other nationalities with a negative coefficient $B = -.205$.

Regarding gender, as depicted in figure 2 below, women have a significantly more positive attitude toward litter when presented with the eyes image ($p = .036 < .05$) and the hero image ($p = .002 < .05$), with coefficients of $B = .373$ and $B = .49$ respectively, compared to a non-significant difference between men and women for the control condition ($p = .337 > .05$) and the dog image ($p = .796 > .05$). Although not significant, men had a more positive attitude toward litter than women when presented with the dog image.

For helping intention, gender is the only independent variable to be statistically significant for both the hero condition ($p = .000 < .05$) and for the entire data set ($p = .001 < .05$), with coefficients $B = 1.037$ and $B = .462$, respectively. However, even though for the other conditions

the difference was not statistically significant, overall, women had a more positive helping intention, as shown in figure 2 bellow:

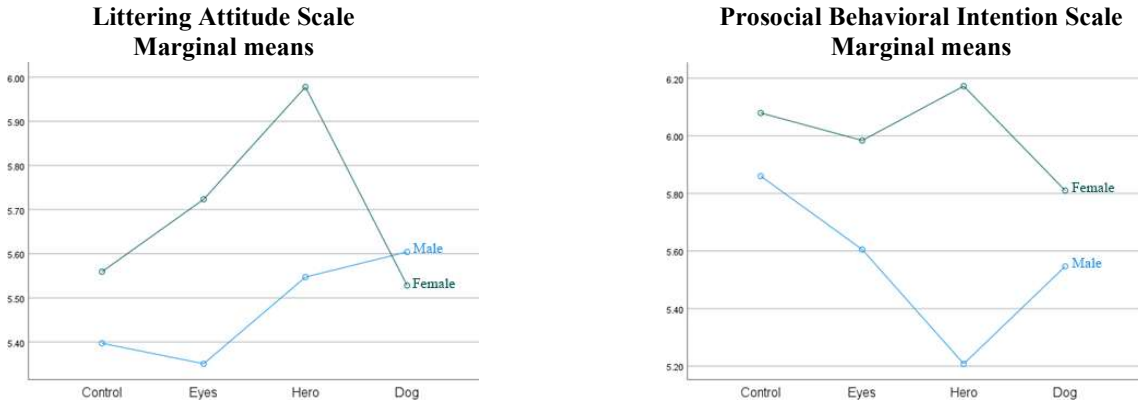

Figure 2: Males and Females means by condition

Finally, given that previous research demonstrated that the younger generation displays a different attitude than adults when primed with images (Borgi et al., 2014; Golle et al., 2013; Luo et al., 2020), age has been divided into two categories, with respondents aged eighteen or below in one category and those aged above eighteen in the second one. Results from the LAS showed that individuals older than eighteen were more receptive to the hero image ($p = .016 < .05$) with a coefficient of .715.

As such, from the results above, given the significance between the control group and the Hero condition for the Littering Attitude Scale, the significance of gender as a predictor of littering, and the significance of age when divided into two categories, regression model 1 (Appendix 6) was built ($F(2, 63) = 7.337$; $p = .001 < .05$), it shows that from all the demographic variables used, age and gender are the primary variable that explain the variation in littering attitude for the Hero condition with $R^2 = 0.189$ and adjusted $R^2 = 0.163$, meaning that 16.3% of the variance in littering attitude is explained by age and gender.

From the results of the Littering Attitude Scale presented above, we can conclude that the Hero image is the most effective Nudge influencing littering attitude, which leads to the

confirmation of H2. Regarding the eyes and the dog images, even though results of the LAS show that priming participants with these two Nudges leads to a more positive attitude toward litter, the results are not statistically significance, which leads to the rejection of H1 and H3. Finally, given the results of the LAS and PBIS, gender appears to be an important variable to take into consideration given that women displayed a consistently more positive attitude toward litter and displayed a higher willingness to offer help.

5. Discussion

Nudges are cheap and fast-to-implement choice architecture tactics that can influence individuals' intention and behavior, they have gained importance during recent years and have been implemented in many contexts and studies (Bammert et al., 2020). Besides their numerous uses to influence people's decision making such as having a healthier lifestyle or exercising more, Nudge interventions have also proven effective to encourage a more altruistic behavior (Ranson & Guttentag, 2019; Van der Meiden et al., 2019). Therefore, Nudge has been the center of attention of researchers in many disciplines and is now being tested and adapted to different areas (Bammert et al., 2020).

This study reveals that the eyes stimulus used for this experiment is neither effective in nudging helping intention nor in influencing a positive attitude toward vandalism. These results are in line with previous studies that used various types of eye cues to test people's reaction under different conditions and in different areas, and that reached a similar conclusion: that eye cues are only effective under specific conditions (Dear et al., 2019; Northover et al., 2017; Vogt et al., 2015; Beyfus et al., 2016). The results of this study showed that the eyes used resulted in a more positive attitude toward litter, compared to the control group, but had the reverse intended effect on helping intention. These insights provide further support to the conclusion that eye cues are not a one-size-

fits-all Nudge, their use is effective under specific conditions and the choice of image to use also impacts the intended effect.

The dog stimulus resulted in similar insights. Previous research concluded that small changes in a baby's face lead to different perceptions of cuteness, likability, attractiveness and motivation for caretaking behavior (Glocker et al., 2009a), which is supported by the results of this study. Findings show that the Baby Schema can be effective under some conditions, and be less effective under others; for instance, although not significant, participants primed with the dog image had a positive attitude toward litter but were not influenced to offer help to others. Also, the study supports previous research regarding the difference in caretaking behavior between males and females (Golle et al., 2013; Venturoso et al., 2019) since the results showed that, even though the overall average was lower than the control group, females were more willing to offer help than men when primed with the dog stimulus.

The hero image was the most effective Nudge toward decreasing vandalism. A large body of literature concluded that the simple increase in accessibility to one's values and morals motivates people to act morally (Christner et al., 2020; Aquino et al., 2009; Waytz & Hofmann, 2020); the present study offers strong support to this theory given the significance of the hero stimulus. The results from both measures also offer ground to conclude that although the hero image is effective, it is only effective under certain conditions, in the present case to decrease vandalism, and does not necessarily nudge people toward helping others.

Similar studies tested the effectiveness of the Watching Eyes Effect on helping intention using a between subject design on Qualtrics survey software, and their results showed that gazing eyes increase helping intention compared to a control group (Manesi et al., 2016). The fact that, in the present study, there was no significant difference between the control group and the three treatments for helping intention (p values > .51) is in line with previous findings which raised

questions regarding the effectiveness of visual cues in curbing antisocial behavior (Dear et al., 2019). Given that the hero stimulus was effective in nudging a positive attitude toward littering but was ineffective in increasing helping intention, it is safe to conclude that a Nudge intervention that yields the intended outcome under a certain circumstance cannot be applied to other contexts with the purpose of having the same outcome, it should be tested first.

Finally, this study shows that there are significant differences between genders, females being more receptive to the Nudges used. These differences have already been uncovered for the Baby Schema, where females' maternal care leads their brain to react differently to the Kindchenschema (Glocker et al., 2009b), having an overall score higher than men whenever presented with a cute, or less cute, picture of a baby; but this study uncovers differences for other Nudges as well. We can fairly conclude that overall, women are more inclined to behave in a prosocial manner than men.

5.1. Theoretical and practical implications

This study is yet another evidence of the importance of using Nudge interventions instead of costly and hard to implement techniques. These insights have implications for researchers, marketers, policymakers, and companies which properties, or the properties they manage, are subject to vandalism, such as elevator maintenance companies, billboards management companies, or cleaning companies mandated for public spaces, schools, and other areas where vandalism is an issue. The use of behavioral interventions in the form of simple images, also referred to by some researcher as artificial surveillance cues, can prove effective in some circumstances. The hero Nudge reminds individuals of their morals and values, which leads them to act morally.

While most researchers focused on testing the Watching Eyes Effect, this study uncovers the impact that other types of Nudge interventions, in the present case in the form of hero images, can have on peoples' attitude. Aquino et al. (2009) hypothesized that increasing the accessibility

to moral identity results in an increased motivation to act morally, in the present study, using behavioral interventions to increase the accessibility to an individual's morals and values decreases the probability that the bespoken person engages in acts of vandalism. This finding adds to the existing literature on using visual cues and should be taken into consideration by both companies and researchers who want to create effective Nudge interventions.

There are mitigated findings about the watching eyes cues, several studies found this stimulus to be effective, while others were not able to reach similar results. In this study, the dog and hero stimuli confirm the theory that each stimulus is condition-dependent and is not a one-size-fits-all solution. Although the hero stimulus was the only significant one for the littering attitude, both the dog and the hero image nudged participants into having a more positive attitude toward littering but resulted in a reverse effect for helping intention. It is therefore important to test a stimulus first, adjust it to the specific population, then apply it to the targeted group.

This research constitutes a contribution to the literature as it provides ground to assert that the use of visual cues to nudge individuals' behavior is situation dependent and does not represent a one-size-fits-all solution, it is hence important to consider the contexts in which experiments are conducted as well as the targeted population before concluding whether a visual cue represents an effective Nudge.

The stimulus is not only condition dependent, it is also gender-dependent. Results from this study showed that females are more positive toward littering, helping intention, and are more influenced by the Nudges used than their male counterparts. As such, managers, companies, policymakers, and researchers intending to use images as Nudges need to take these differences into consideration as well, determine which gender is dominant in the targeted population, and either create and test a stimulus that is primary intended to the dominant gender, or test stimuli that are equally effective on both women and men.

Finally, given the melting pot of nationalities that participated to this study, testing the impact of each Nudge on specific nationality was not possible for all; however, results showed that Moroccans have a more negative attitude toward litter, this is particularly relevant for multinational companies operating in a variety of markets and who therefore, although having a standardized product or service, need to adapt these strategies to specific nationalities.

5.2. Limitations and further research

While this study gives useful insights, it has some limitations that need to be taken into consideration. The first limitation is the methodology used. The use of scenarios enables researchers to address complex problems and generate interesting results, it is also a good fit to complement surveys (Ramirez et al., 2015). However, although the questionnaire used relied on validated scales that have been used in previous research, the stimuli were apparent throughout the entire time participants were filling the questionnaire, and a scenario was used to bring participants as close as possible to the situation being tested, the methodology used limits the generalization of the results since the use of self-reported measures, unlike experiments or observing behavior, may result in a response bias, especially in studies involving behavioral research (Rosenman et al., 2011). This could be addressed in future studies, with researchers relying on the present findings as ground to build experiments in labs using printed pictures, which will ensure a higher control and a closer simulation of the conditions being tested. Future studies can also use an observational approach in a real-life situation by adding images to physical elevators and observing people' reaction and behavior.

Another limitation of this study is the restricted time frame to gather data and the high number of nationalities represented in the study, which led to a smaller and diverse sample size that cannot accurately represent the entire population. Given the high number of differences across

nationalities and cultures, and these differences' impact on individuals' behavior, norms, values, and reaction to stimuli, future researchers can use a more localized approach by relying on a country or region-specific data collection approach to have data representative of a defined group.

The limited time frame did also not allow for a test of the images with and without the messages, as well as other variation of the stimuli used (e.g., different colors, different heroes, different shapes…). Future researchers can address these limitations by using more conditions in which some elements of the stimuli are different, which can result in more accurate insights and reveal the level of behavioral influence of each element in a stimulus.

6. Conclusion

The use of Nudges to influence people's behavior in different contexts has been growing during the last decade, behavioral interventions have proven very effective and can be a useful alternative to existing methods. The present study offers solid ground to the use of hero images as a behavioral intervention, appealing to individuals' morals and values, to reduce vandalism in elevators. It also confirms previous research that resulted in mitigated findings in which the use of visual cues has been effective under some condition and did not yield conclusive results under others (Northover et al., 2017; Vogt et al., 2015). These results indicate that the use of Nudges and their effectiveness is dependent on the context in which they are applied and do not represent a one-size-fits-all solution to be applied in all circumstances. Finally, this study also offers insights regarding the importance of considering other variables, mainly gender, but also nationality and age of the targeted population. These findings are useful not only to researchers, companies, and marketers, but also to policymakers that sometimes rely on costly techniques while they can use less expensive, and easier to implement choice architecture methods.

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Appendixes

Appendix 1: Eyes image – Watching Eyes Effect

Appendix 2: Hero image – Morals and values' appeal

Appendix 3: Cute gazing dog – Baby Schema (Kindchenschema)

Take care of the elevators.
Oscar is tired of using the stairs!

Appendix 4: Descriptive statistics

		Conditions				Total
		Control	Watching Eyes	Hero	Gazing Dog	
	Sample size	66	66	66	66	264
Nationality	*Morocco*	24	18	20	27	89
	Portugal	9	8	6	5	28
	United States	8	4	5	6	23
	Germany	5	3	6	6	20
	United Kingdom	3	3	4	1	11
	Italy	1	2	2	2	7
	Others	16	28	23	19	86
Gender	*Male*	25	19	24	16	84
	Female	41	47	42	50	180
Level of Education	*Less than high school degree*	2	1	0	1	4
	High school graduate	21	13	18	20	72
	Bachelor's degree	21	32	31	25	109
	Master's degree	20	20	16	20	76
	Ph.D	2	0	1	0	3
Age Range	*<19*	10	4	5	6	25
	19-24	34	36	37	45	152
	25-34	16	20	20	12	68
	35<	6	6	4	3	19

Appendix 5: Scales

Littering Attitude Scale:

1- Even though my surrounding is littered, I don't worry much about it.

2- When a bin is full, I will carry my litter to the nearest empty litter bin.

3- I believe litter does not hurt anyone.

4- Litter is unsightly.

5- Seeing litter in drainages upsets me personally.

6- I am not comfortable in a littered surrounding.

7- I can participate in removing litter in my community.

8- In the absence of an empty litter bin nearby, it is ok to throw litter beside a full litter bin.

9- I feel uncomfortable whenever I am in a littered environment.

10- Litter is only considered a problem when it hurts one's personal well-being.

11- I think time spent in removing litter from public places is wasted.

12- Litter is only considered a problem when it hurts the well-being of others.

13- If I have enough time or money, I would certainly devote some of it to the removal of litter in my community.

14- When a litter bin is full, it is ok to throw waste on the ground near the litter bin.

15- If anything, I must admit to a slight dislike of litterers.

Prosocial Behavioral Intention Scale:

1- Comfort someone I know after they experience a hardship.

2- Help a stranger find something they lost, like their key or a pet.

3- Help care for a sick friend or relative.

4- Assist a stranger with a small task (e.g., help carry groceries, watch their things while they use the restroom).

Appendix 6: Littering Attitude Scale – Hero condition regression model

Model 1		
Explanatory variables	*Coefficient B*	*P-value*
Constant	4.907	.000
Gender	.422	.007
Age	.699	.013

Dependent variable: Littering attitude score
Independent variable: Gender (Male = 0; Female = 1); Age ("equal to or below 18" = 0; "above 18" = 1)